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This account of the history of the National Science Foundation Elementary Institutes begins with the National Science Foundation (NSF) Act of 1950. The Cooperative College-School Science Program and pilot programs prior to fiscal year 1959 are described. Separate sections are devoted to the presentation of statistics for each Summer Institute Program conducted by NSF for the summer 1959-66. Such statistics include the number of proposals granted, total budget, and the number of participants. The Elementary School In-Service Institute Programs for the years 1959-67 are also discussed in a similar style. Selected statistics are presented in six tables in the appendix. Information presented summarizes materials discussed in the text of the study. The report indicates the National Science Foundation supported 531 institutes from 1959-67, with an actual attendance of 22,045 elementary school personnel. (BC)

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HISTORY AND DEVELOPMENT
OF
NATIONAL SCIENCE FOUNDATION ELEMENTARY INSTITUTES
1959 – 1967

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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The National Science Foundation Act of 1950

The National Science Foundation Act of 1950 was enacted by the Senate and the House of Representatives to: Promote the progress of science; advance the national health, prosperity, and welfare; secure the national defense; and for other purposes. This act was cited as the "National Science Foundation Act of 1950," Public Law 507-81st Congress. A statement in Section 2 of this Act says, "There is hereby established in the executive branch of the Government an independent agency to be known as the National Science Foundation." The Foundation was authorized and directed to carry out several functions, one of which was to provide for the development and encouragement of the pursuit of a national policy for the promotion of basic research and education in the sciences.

Originally four divisions were established within the Foundation. One of these divisions was known as the Division of Scientific Personnel and Education. In the early part of 1965 organizational structure of the NSF was revised and the SPE division was reorganized into three divisions: Graduate Education in the Sciences, Undergraduate Education in the Sciences, and Pre-College Education in the Sciences.

The programs for elementary school personnel were in the Pre-College Division, since the teachers involved were teachers of pre-college students. Within the PES division there are two sections. The Student and Curriculum Improvement Section houses the Course Content Improvement Program and the Student and Cooperative Program. The former has been primarily the funding agency for the Elementary Science Study, The American Association for the Advancement of Science Commission on Science Education - Process Approach, Science Curriculum Improvement Study, Elementary School Science Project, and others.

The majority of this study was completed while the author was serving as Assistant Program Director, Teacher Education Section, National Science Foundation

The Teacher Education Section is the other section of the PES division and houses the Summer Study Program and the Research Training and Academic Year Study Program. The two programs reported in this study for elementary school personnel were equally divided between the two programs of the Teacher Education Section. That is, the Summer Institutes were in the Summer Program and the In-Service Institutes were housed in the Research Training and Academic Year Study Program.

The first institutes supported under grants from the National Science Foundation were made for the Fiscal Year 1953. Two programs for college teachers were supported that year for forty-two participants at an expenditure of $22,250. The following year there were three college summer institutes and one secondary summer institute (with a total expenditure of $50,500). These included ninety-seven participants. The program continued to grow in 1955 with eleven proposals being supported for 299 participants at a cost of $147,350. In 1956 the secondary academic year institute and the secondary in-service institute programs were added for a total of twenty-nine different institutes with support for 1,390 participants at a cost of $1,123,450. The large growth appeared in 1957 with 133 institutes being supported, ninety-one in secondary summer programs, with an expenditure of $9,629,686. These included 6,517 participants.

Pilot Programs Prior to Fiscal Year 1959

It was not until 1959 that institutes were formally initiated for elementary school personnel in the form of summer institutes and in-service institutes. See Table I for Program History. (All Tables appear at the end of this paper.)

Prior to 1959 there was a great deal of discussion about elementary school personnel institutes and programs prior to the initiation of the first grants for this group.

There were several pilot programs supported by the NSF in in-service and summer programs over the years 1957, 1958, and 1959.

Several staff papers written from 1957 through 1960 indicated that the Foundation was very much interested and concerned, but was unsure of the direction a program for elementary school teaching personnel should follow. The thoughts of the Foundation could be summed up by a statement in a letter dated February 10, 1960, from Dr. Alan Waterman to Dr. James B. Conant: "All in all, it seems to me that perhaps our greatest danger lies in going too fast and too far with pre-conceived notions about elementary science instruction before we have had the opportunity to think this over and confer with the experience of knowledgeable people." It was for this reason that the Foundation was moving into this area rather slowly.

Some of the first elementary teacher education programs supported by the Foundation date back to 1957 and 1958. During the summer of 1957, Rutgers held a ten-day science institute that involved elementary school personnel. This program at Rutgers had started in 1950 and had been carried on with private support until 1957. The National Science Foundation supported the program during the summer of 1957. Also, that same summer the University of Kentucky held a summer conference that involved elementary as well as secondary teachers. The primary goal in this conference was one of working and familiarizing teachers with materials, equipment, and books. Two sections of a five-part program were devoted to elementary school personnel.

Duke University had a program during the summer of 1957 and also another during the summer of 1958 which had sections for elementary school supervisors, in addition to the sections for high school teachers of science and mathematics. The NSF-supported programs were follow-ups of earlier attempts by Duke University to upgrade the elementary school teacher. The first summer at Duke there were twenty-four elementary school supervisors in attendance for a six-week period and in 1958 there were fifteen elementary science supervisors.

During the summer of 1958 the University of Rochester had a summer program for fifty elementary teachers for a six-week period. Subject matter was in the area of general science, and participants were active teachers in grades 4, 5, and 6 who were willing to devote time to helping their fellow teachers. This type of program contained the "multiplier effect" (reaching large numbers). Participants also agreed to help in a follow-up evaluation.

Rutgers offered a four-week conference during the summer of 1959 for elementary school personnel. The University had conducted this program for several years before seeking outside support. This conference was in earth science and was later supported as part of the regular NSF summer institute offering.

During the pre-1959 years there was only one in-service institute supported by the NSF. This program was at the University of Colorado for twenty-nine Boulder, Colorado elementary school teachers. This particular program served as the basis for a granted summer institute in 1959 and for several in-service institutes at the University during the sixties.

After the official start of supported programs in 1959 for elementary school personnel in summer and in-service institutes, there were several other non-programmatic proposals that received support. In 1961, Miami University of Ohio carried on several workshops during a one and one-half year period for improving the elementary teachers' abilities in selection and use of science equipment. Approximately 150 teachers were involved in four school systems. The workshops lasted for approximately twenty-six clock hours of instruction and had as their main purpose the preparation of simple science equipment, improvement in selection of equipment and books, and help for the classroom teacher in using these materials in the elementary school. In the summer of 1962 Michigan State University worked with sixteen Michigan secondary school teachers in the area of mathematics to

prepare materials which were to serve as a basis of in-service training programs for elementary teachers. This program was quite successful, and the grant also provided for an evaluator to visit the teachers' schools during the following year.

An original grant of $60,320 was made to Emory University for an in-service television program starting in 1960-61. Subsequent grants were made so that this was a continuing program through the end of the 1962-63 academic year. The format of this program called for a weekly telecast with participants making monthly visits to the campus of either Emory University or the University of Georgia. Participants received five semester hours of credit and a small travel allowance. One hundred ninety-three teachers were given grades during the 1961-62 school year. In addition, the 1961-62 program, Emory held an August workshop, with approximately 1,000 elementary teachers attending. Six seminars were set up in the Waycross, Georgia, area with twenty-five to fifty teachers at each center. No course credit was given, and the primary purpose was to work out implementation of the new state science guide. A subsequent grant during the 1962-63 academic year provided for the establishment of eight county wide centers, providing a university consultant, a curriculum director, and two competent high school teachers to work with the teachers at the county centers after the teachers had viewed a weekly telecast concerning the Georgia science curriculum.

An in-service elementary mathematics program for high school teachers was carried on at the University of Washington and had as its primary purpose the training of seventy-five high school teachers in mathematics - fifteen at a time in three-day institutes. Instruction was geared to give them methods of elementary school mathematics so they could assist elementary school teachers.

Two different grants have been made to Southeastern State College in Oklahoma for in-service mathematics television programming. The first grant was in 1963-64, and a subsequent grant was made in 1964-65. A third one for the 1965-66 school year was tied in with the regular in-service institute program.

Cooperative College-School Science Program

The CCSS is a program designed for local school improvement. Since many elementary and secondary school systems are attempting to effect substantial improvements in their instructional programs, the CCSS was brought into existence. In many instances the active cooperation of competent scientists and mathematicians were and are of material help in implementing the programs. One of the primary purposes of the CCSS Program is to make it possible for some school systems to obtain the assistance of scientists and mathematicians in working out local problems. Prior to 1964-65 there were very few elementary teachers involved in the cooperative program.

The first program supported under CCSS (that included elementary participants) was at the University of New Hampshire. This program was concerned with planning and implementing an improved science program. A subsequent grant continued the program through the 1965-66 school year, with thirty commuting participants.

A third CCSS program was carried out during the 1965-66 school year at the University of Detroit for improving the teaching of mathematics in thirty elementary schools. Since these original grants were made, there have been additional programs supported at several different schools.

The Beginning of Elementary Institutes

In the beginning the institutes' programs were limited to high school and college teachers. In 1959, a memorandum from Dr. Harry Kelly to Dr. Alan Waterman set up the first pilot program of in-service institutes. In this memorandum Dr. Kelly recommended that the now available funds amounting to approximately $100,000 be used to set up a program of in-service institutes for elementary school teachers and supervisors of science and mathematics during the 1959-60 academic year. Because of the limited size of the proposed program he further recommended that no general announcement be made, but that all those institutions which have already

shown interest be notified that limited funds would be available for the support of a few pilot programs. Similar reasoning was followed in the development of the summer program.

The program objectives have been constant since the beginning. These included: (1) to give educational institutions funding to provide opportunities to develop significant new materials suitable for training elementary teachers, (2) to provide suitable training for "key teachers and other personnal in leadership positions - supervisors, principals, and specialist teachers," and (3) to develop innovative prototypes for local teacher-training efforts.

Over the years there have been numerous types of experimental programs proposed. The assumption was made that there would be a large teacher response to the limited number of elementary teacher programs. A staff paper prepared on August 12, 1958, discussed some other possibilities for giving assistance to an appreciable fraction of the elementary teachers throughout the country. (It is interesting to note that the staff paper in 1958 made reference to the 787,000 elementary teachers in the United States. Current figures used in this paper are based on 1,100,600 elementary teachers in the United States.) Table I and II present the program history of the growthof both the in-service and the summer programs.

Pertinent Points on the Summer Institute Programs

Tables I, III, and V are concerned with the summer programs. The Program History, Table I, indicates a steady growth from the twelve initial programs (in 1959) to thirty-nine during the summer of 1965. This number was reduced to twenty-six during the summer of 1966 which was the last year of support for elementary summer institutes. Over the eight-year period, approximately twenty-three percent of the elementary proposals submitted to the Foundation were supported. Table V shows the distribution of proposals submitted in seven subject areas and the number

of institutes granted in each of the areas. Earth Science and Mathematics-Science proposals gained a little more favorable support than some of the other areas. Mathematics departments seemed to be more aggressive in submitting proposals than some of the other areas. The social science proposals were not included in the beginning of the program, but were submitted in 1964.

Table III indicates the total number of teachers by state of residence attending summer institutes. Two sets of data appear in this table: the total participants from a particular state and the percent of participants in that state based on the total number of elementary teachers in the United States. This ranges from .0007% for Alaska to .045% from New York State. The second column is based on the number of participants in that particular state compared to the number of teachers in that state. Idaho lead the group with 6.7% of the teachers in the state attending summer institutes. This was primarily due to a unique summer program in 1965 when Idaho State University set up four centers in the state and conducted the summer program on the basis of an in-service program.

The geographic distribution of participants appears to be most equitable. In some states and areas teachers evidently were not interested in applying. In others there was a great deal of interest. In glancing at the list it is apparent that a relatively small percentage of teachers from the United States have had the opportunity to take part in a summer program for elementary school personnel. With very few exceptions most of the numbers are below 1%. For both programs, in-service and summer, the NSF has reached about 1.6% of the elementary school personnel in the United States. However, these participants, because of emphasis on the "key teacher" idea, have reached many more. The number would be most difficult to obtain. The director of one summer institute estimated that the thirty participants in the summer program at his institution worked with 650 elementary teachers during the following year. The summer institute involved the building of an in-service

course to be used by participants in their home school districts. One of the selection criteria was a statement from the teacher's immediate supervisor indicating that the participant would be allowed to carry out an in-service program in his home school during the year following attendance at the summer institute. Many of the summer institutes used this criteria.

The number of completed applications per stipend available in the summer program was twenty to one. That is, twenty completed applications were received by each director for each stipend available. In 1962 the Elementary Summer Institute program was given wider publicity in several journals, and the number of applications rose to about twenty-four to one. Some states did a much more active job in informing elementary teachers of this opportunity.

Summer 1959

The summer program in 1959 received fifty-four proposals, with a total budget request of $2,301,832 for support of 2,382 participants. The actual grants made included twelve institutes for a total granted budget of $470,300 and 515 participants. Actual attendance at the summer institutes was 547. The institutes offered courses and activities especially designed to meet the needs of elementary school supervisors and teachers. The program was patterned after the established and successful program of summer institutes for high school and college teachers. An examination of the director's reports indicated that all of the institutes offered from four to eight semester hours of graduate credit and of the twelve institutes - two were in mathematics and ten were in science areas. Men outnumbered women approximately two to one in attendance at these first institutes. The completed application to stipend ratio was approximately ten to one.

It is interesting to note that several of the schools having these first institutes have completed follow-up studies. In one particular school, ten persons enrolled in their first institute now have a doctorate and are employed as science

supervisors or curriculum directors in city systems. These people are now employed from Louisiana to Wisconsin, Oregon to North Carolina. The director of this particular program at the University of Kansas felt that the institute had something to do with the generation and stimulation of interest through the institute program in encouraging graduate work.

Summer 1960

This was the second phase of the exploratory program in elementary institutes by the National Science Foundation. The 1960 summer program received a total of eighty-four proposals and an asking budget of $3,743,940 to support 3,607 participants. In actuality, sixteen institutes were granted, at a cost of $522,100 for 545 participants. This year 570 people actually participated. Men continued to outnumber women approximately three to one. Two of the sixteen schools offered undergraduate credit for the work taken. One of these was in mathematics and the other was in geology and astronomy. The other institutes offered graduate credit to be counted toward a graduate degree in elementary education. This has been typical of all the graduate credit offerings of the institute programs, whether they were summer or in-service. The application-to-stipend ratio was higher for 1960, with thirteen completed applications to each stipend available. In some schools this ratio was as high as twenty to one.

Summer 1961

The 1961 program was funded for nineteen summer institutes and was still considered to be an experimental program involving "key" elementary teachers. This was the first year that rather extensive publicity was given to the elementary summer institute program. One hundred twenty-one proposals were submitted for an asking budget of $4,754,246 to support 4,995 participants. Funds were available in the amount of $656,500 to award nineteen summer institutes for 650 persons.

Here again, 712 participants were included in the program by the institute directors. Of the nineteen schools offering institutes, three were for undergraduate credit only, and the balance were included as graduate work counting toward an elementary education degree. The Elementary Science Bulletin of the National Science Teachers Association ran a listing, along with The Mathematics Teacher. This widespread publicity, along with the NSF brochures, resulted in many institutions receiving large numbers of applications. New Jersey State College had 1,400 completed applications for thirty-five stipends and the University of Buffalo had 1,087 completed applications for thirty-five stipends available.

Summer 1962

A total of eighty-six proposals were received for the 1962 program. Of this number, sixty-one (or about 70%) were considered worthy of support if sufficient funds were available. There was a rather large drop-off in the number of proposals submitted for the 1962 program. This reflected the fact that only nineteen grants were made from 121 proposals for the 1961 summer program. There appeared to be no evidence that interest in programs had declined for the 1962 elementary institutes: 14,305 applications were received to fill 650 stipends for an average of just over twenty-two completed applications for each stipend available. This demand was without benefit of a concentrated effort on national publicity. In 1963 the NSF started printing the brochure for widespr ead distribution. The National Science Teachers Association and the National Council of Teachers of Mathematics published a listing each year, but these publications reached only about ten percent of the elementary school personnel.

In the twenty-one grants for summer 1962 there were ten renewals from previous institutes, nine with little or no modification, and one with a change in subject matter.

The proposals considered to be meritorious would have involved a budget of over $2,000,000 with support for over 2,000 participants. The twenty-one supported proposals represented eighteen states. The number included six in mathematics, two in general science and mathematics, one in physical science and mathematics, one in biology and mathematics, three in general science, one in physical science, one in chemistry, one in chemistry and physics, two in earth sciences, two in earth science and biology, and one in earth science and chemistry.

Summer 1963

Forty states, the District of Columbia, and Puerto Rico submitted a total of ninety-five proposals for consideration for the 1963 summer program. The proposals requested support for 3,249 participants at a total projected cost of $3,181,487. This continued the expanding interest in the elementary program as it had grown since the initial grants were made in 1959.

In the study of the ninety-five proposals received, seventy-two (or about 75%) were considered meritorious by the panelists. From these eligible proposals thirty-four were granted for the 1963 summer program. This provided support for 1,036 participants, with an allotment of $1,058.800. This group represented wide geographic coverage of twenty-six states and Puerto Rico. In the presentation document the program director included some participant data from twelve representative institutions in the 1962 summer program. The directors chose their 406 participants from 9,010 completed applications. This was an average of twenty-two applications for each stipend available. In addition, the directors reported 20,774 inquiries, which averages out to be fifty-one inquiries per stipend available. This certainly indicated a demand for programs of this type. Study of subsequent years indicated the same interest.

Summer 1964

A new high of 140 proposals was received from forty-one states, Guam, and Puerto Rico by the deadline date. The advisory panels were invited to judge the proposals and after they had been considered by the panelists, 101 (or 67%) of the proposals were considered to be highly meritorious and worthy of support if funding was available. From these eligible proposals thirty-seven were supported for the 1964 summer program for 1,235 participants at a cost of $1,270,789.

This group represented a wide geographical coverage of thirty states, as well as distribution in the specialized areas of science. In the summer of 1963 there were thirty-four grants supported. Of these thirty-four supported programs, thirty-two reapplied and twenty-one of these were supported along with sixteen new proposals making up the 1964 program. This demonstrated the opportunity for new institutes to gain acceptance in a very competitive total program.

Summer 1965

Almost 76% (116 of 151) of the proposals received for 1965 were in the meritorious and excellent categories. The majority of these programs were considered worthy of support if funds were available. The recommended program of thirty-nine institutes for 1,459 participants at an approximate cost of $1,271,860 was within the funding available for the 1965 program. Thirty-five of the 151 proposals were received from institutions participating in the summer of 1964. The other 116 proposals were received from institutions who were not in the 1964 program and their proposals were classified as new. Of the thirty-nine grants, twenty-one (54%) were renewals of institutes supported in 1964 and eighteen (46%) were for new institutes. Thus, 60% of the renewal requests and 15% of the new proposals were supported in the 1965 program. Wide geographic distribution was apparent in the program, since receipts of the proposals were from 128 institutions,

forty-one states, the District of Columbia, and Puerto Rico. Similar distribution is apparent in the granted program with thirty-eight institutions in twenty-three states and one institute in American Samoa.

Each of the summer institutes was designed primarily for key elementary school personnel. A "key" person was considered to be one who would be in a position to spread the result of the conference to his fellow teachers. This was also called the "multiplier effect." In addition to the key idea, the program at Idaho State University was held in four centers; Idaho Falls, Burley, Mountain Home, and Payette. In this program the instructors went to the four localities and presented the course work. There were no stipends awarded for the participants, but tuition and fees were paid through the operational expense of the institute. The local school systems contributed a house for the visiting professor for the duration of the institute.

Three of the programs of this summer had specific in-service tra ing clauses built into the selection procedures. The programs at the University of Vermont, the University of Colorado, and Columbia University required their participants to teach an in-service institute when they returned to their home school.

Summer 1966

One hundred twenty-two proposals were received by the NSF for the 1966 summer program. (The deadline date was moved ahead one month, and this wasn't noted by many prospective directors). These proposals came from forty-two states and the District of Columbia. $4,528,284 was requested for 4,822 elementary school supervisors and teachers. Of the thirty-nine projects supported during the summer of 1965, thirty-three requested renewals of their institutes. Grants were recommended for twenty-six summer institutes at a cost of $864,440 for 988 participants (see Table I). One of the programs was supported under the Program of Summer Institutes

for Secondary School Teachers. This proposal was for the University of Hawaii's project in American Samoa.

Emphasis on the 1966 program was on programs that included the so-called "multiplier effect." Projects reflecting this potential were encouraged, and panelists were made aware of the desirability of supporting projects that would ultimately reach a large number of elementary school personnel. It was noted that the Cooperative College-School Science Program tended to complement the 1966 summer program. Five of the eight grants of CCSP designed for elementary school personnel were awarded in the District of Columbia and four states not receiving grants in the Summer Institute Program -- Louisiana, Missouri, South Carolina, and South Dakota. Other CCSS were awarded in California, Maryland, and Virginia.

The subject matter distribution for 1966 included the following:

Area	Proposals	Grants
Biological Science	2	1
Earth Science	6	3
General Science	20	2
Mathematics	57	10
Math and Science	18	6
Physical Science	19	4
Social Science	0	0
Totals	122	26

Pertinent Points on the In-Service Institute Program

The In-Service Institutes offered instruction during the academic year at times convenient to enable teachers to attend while still teaching full-time in their schools. These were traditionally held evenings, Saturdays, or late afternoons. An experimental program for elementary school personnel was initiated in 1959-60 with eleven institutes. Since that time, the program has grown and in the final school year of 1966-67 there were fifty-five institutes offered over the country by colleges and universities. The high was reached in 1964-65 with seventy

institutes for 2,118 participants. The 1966-67 program consisted of fifty-five institutes, but the number of teachers reached was 4,225. It was the hope in both summer institutes and the in-service institutes that insights gained by the participants could be passed on to other elementary teachers in their home schools. For this reason, it was suggested from the beginning that special consideration be given to selection as participants those teachers who would provide leadership in developing science and mathematics curriculum, and principals or supervisors who would have direct concern with these subjects. Often times, participants who are elementary or secondary teachers may serve as instructors in local in-service institutes under the continued guidance of the university supervisor or visitor. Since the beginning there was a small travel allowance, a book allowance, and tuition and fees for the participants. The operational costs were underwritten by the NSF, along with the participant's support.

In-Service 1959-1960

The first eleven institutes were supported with a grant of $80,600 for 340 participants. Actually, 346 people attended these first eleven institutes. The eleven institutes were selected from thirty-six proposals requesting a budget of $283,375 to support 1,190 participants. All of the directors reported a fair amount of success with these initial efforts, but it was found that teachers were not as enthusiastic to sign up for the in-service offerings as they were the summer courses. Hence, the ratio of completed applications to travel allowances available was quite small as compared to the summer program.

Included in the first set of in-service institutes were two in biological science, one in earth science, four in mathematics, three in mathematics-science, and one in physical science.

In-Service 1960-1961

The Foundation received forty-three proposals for this year's program requesting a budget of $380,700 to support 1,350 elementary teachers. A total amount of $73,990 was made available to support thirteen institutes for 405 participitants with 434 actually attending. As with all the NSF institute programs the primary consideration was given to the quality rating of the advisory panels. Important consideration was also given to the merits of individual proposals as experiments in developing mechanisms for bringing needed subject matter knowledge to the nation's elementary school teachers. In keeping with this there was a good geographical distribution in spite of the fact that no effort was made to obtain such a distribution. Subject distribution was as follows: one in biological science, four in general science, four in mathematics, one in mathematics-science, and three in physical science.

During this year the initial Emory University proposal for a television course for elementary school teachers was made. This program dealt primarily with the content material of the new (at that time) Georgia Science Guide.

In-Service 1961-1962

There was a large jump from the previous year to the 1961-62 academic year as far as expenditures and the number of granted in-service institutes. In 1961-62 there were thirty-five institutes granted for $200,930 to cover operational expenses and travel allowances for 1,014 participants. Seventy-five proposals were submitted with a budget request of $724,680 to support 2,384 participants.

Subject distribution included: one in biological science, one in earth science, nine in general science, fourteen in mathematics, two in mathematics-science, and eight in physical science.

The wide gap that existed (and still exists) between the science material which elementary teachers are prepared to offer to their classes and that which is

essential for the education of their students was clearly delineated in various local studies reported in the proposals of this year. Surveys have indicated that elementary teachers had as few as six hours of college science and three hours of college mathematics. Those who had slightly more reported that very few of the science courses they had taken had presented the subject matter in such a fashion that they could use it easily at the elementary level. The reported interest on the part of teachers in prospective new institute instruction far exceeded the capacity of each of the institutes proposed. Further evidence of widespread interest in these experimental programs was demonstrated by the informal queries regarding NSF support of programs for elementary school personnel and by the increased number of proposals received.

Proposed mathematics programs featured the study of the development of the number system, measurement, logic, and set theory. The objectives of the programs attempted to give the teacher an understanding of the theoretical background and structure of arithmetic so that this understanding could be imparted to their students. At this time, several of the proposed in-service programs suggested a high correlation with the arithmetic materials being developed by the School Mathematics Study Group, University of Illinois, Madison Project, and the elementary school geometry materials being developed at Stanford at that time.

The proposed science programs emphasized the general principles of science and the development of an awareness of the scientific method, rather than the accumulation of facts and figures. Emphasis was also placed on developing the teachers' knowledgeability and willingness to consult a variety of source materials. A wide range of subject matter was proposed this particular year. Costs data for the 1961-62 program indicated that the typical in-service institute would cost about $6,000 and would provide subject matter instruction for about thirty people in each section of the class. The total cost of $200 per participant would provide

a $60 travel allowance, $10 book allowance, $2 for health fee, $114 for direct operating costs, and $14 indirect cost of the sponsoring institution.

In-Service 1962-1963

Eighty proposals were received by the Foundation, with an asking budget of $387,167 to support 2,937 participants. Thirty-five institutes were supported at a cost of $202,665 and included the usual in-service support for 1,060 participants. Actually, 1,294 persons attended these in-service programs. The eighty proposals submitted were from thirty-three different states and Puerto Rico and represented seventy-six different institutions. Again the advisory panels looked closely at the experimental nature of these proposals and gave serious consideration to those including innovations that had not been included previously. Thirty-five proposals recommended for grants in this program included astronomy, biology, chemistry, earth science, and several combinations of general science alone or in combination with other fields. Twenty-eight of the denied proposals were considered by the panelists to be highly meritorious and would have been recommended for grants if sufficient funding had been available.

In-Service 1963-1964

One hundred and four proposals were received from thirty-six states and Puerto Rico and represented ninety-seven institutions of higher learning for the 1963-64 program. The proposals requested support for 4,895 participants at a total cost of $1,021,137. Of the total number of proposals submitted for consideration, the Foundation was able to support forty-six of them at a cost of $299,760 to include support for 1,403 participants. The number actually attending was 1,355. Of the 104 proposals received, eighty-one (or about 80%) were considered worthy of support. In the program grants the geographical coverage consisted of twenty-six states on the mainland, the University of Hawaii, and the University of Puerto Rico.

The specialized areas included mathematics, biological sciences, astronomy, physical science, general science, earth science, and mathematics combinations. During this year, two special institutes introduced experimental programs. At the University of Vermont -- the in-service institute was designed to use as instructors those teachers who had received special preparation in the previous summer elementary institute. The in-service program was supervised by a staff member from the University of Vermont. At the University of Hawaii -- a combined presentation for two half-hour televised programs and a weekly campus discussion was carried out in the field of mathematics. This offered the opportunity for an expanded coverage to teachers on the other islands as well as the preparation of tapes for continued use in subsequent years.

In-Service 1964-1965

One hundred and thirty-eight proposals were received from forty-two states and Puerto Rico and 126 different institutions for the 1964-65 in-service program. The proposals requested support for 6,020 participants at a total estimated cost of $1,184,904. In the subsequent study of the 138 proposals, 111 (or about 80%) were considered worthy of support if funding became available. However, funds were available to support only seventy institutes at a budget of $464,630 for 2,118 participants. The actual attendance at the 1964-65 institutes was 2,365. Thirty-nine of the 1963-64 institute directors reapplied for 1964-65. Twenty-eight were recommended for support along with forty-two new proposals.

The special experimental program continued at the University of Vermont that was initiated during the previous year. A second experimental in the physical science field was at the University of Hawaii. The previous year's programs had been in biology, earth science, and mathematics. A report from the experimental program at the University of Vermont indicated that twenty-six of the thirty

participants in their summer program (1964) conducted in-service programs in their home school districts. A total of 1,421 teachers were reached through the in-service program and 37,629 children were influenced. A report from the University of Colorado indicated that 1,670 teachers benefited directly from the summer institute through in-service courses in the home school districts during the 1964-65 academic year.

In-Service 1965-1966

Institutions in forty-two states and Puerto Rico sent in a total of 152 proposals for the 1965-66 program. These proposals came from 135 different institutions of higher learning. The group included fifty-seven renewal requests from the seventy programs operating during the 1964-65 academic year and ninety-five new proposals. The proposals requested support for 7,419 participants at a total cost of $1,386,602.

Study of the 152 proposals indicated that 120 (or 79%) of the group were considered worthy of support. From the 120 eligible proposals sixty-two were recommended to mount the program and included thirty new proposals and thirty-two renewal proposals with a total expenditure of $466,615 to support 3,082 participants.

There were several experimental type programs included in the 1965-66 program and these are briefly discussed below. Southeastern State College in Oklahoma had two proposals combined so that a comparative study of the fifty participants in a typical in-service institute could be compared to a sample in the television course. There was a potential of several thousand teachers in the State of Oklahoma and North Texas that could have conceivably taken advantage of the mathematics course on television. Films being used in this in-service course were prepared under a previous NSF grant from another division in the Foundation.

The State University College at Buffalo experimented with a large single lecture section of approximately 150 students. The lectures were followed by small

discussion and problem sessions. Team teaching was used to correlate the small sessions with the general lectures.

College of Idaho at Caldwell organized a program operating through ten centers in the state. The course work was taught by instructors who had been trained primarily through NSF programs, and the instructors had been quite active in the modern mathematics movement in the State of Idaho. In this program, the local school systems are contributing to the instructional costs and cooperating very closely with the College of Idaho. In addition to the University of Idaho, Idaho State University, College of Idaho, and Brigham Young University gave undergraduate credit through their extension division for students completing the course work satisfactorily.

The institute at Drake University supplied support for thirty participant consultants who attended classes at the beginning of the week for a total of sixteen weeks. The director worked with this class for a three-hour session and then, on the next day, he televised a thirty-minute lesson that was viewed by a large number of Des Moines and surrounding area teachers. The people in the class then acted as discussion leaders in thirty of the schools. The director recorded the lessons on video tape. He then was able to visit approximately half of the centers when the program was being telecast. In this particular program the public schools in Des Moines, Iowa, contributed approximately $7,500 through their television facility for carrying on this course.

The University of Georgia at Athens offered a course in mathematics at twenty centers throughout the state with graduate credit being offered for satisfactory completion of the course. All of the instructors in these centers were approved by the graduate faculty in mathematics at the University for offering this course for graduate credit. Local school systems contributed to the operational cost in varying degrees up to $500. The instructors were well qualified and specially

trained for the job they did. There was a two-week orientation meeting in August, 1964, for the instructors working in the program.

The University of Hawaii offered two televised classes per week covering the outlying islands as well as the main island of Oahu. On alternate Saturdays a University staff member traveled to the outlying islands to conduct discussion sessions and worked with the teachers in these locations. In this particular situation the College of Education assumed 75% of the costs of taping the sessions for the televised classes.

The seventh experimental-supported programs this year was at the Rutgers University. The program operated six centers in central New Jersey. The courses were taught by local teachers and supervisors trained in previous NSF institutes. Six hours of graduate credit toward an advanced degree was obtained by satisfactorily completing the program. Subject matter was in general science, and the six hours of graduate credit could be used to meet the science requirement for the master's degree in elementary education from the University.

In-Service 1966-1967

The final year of support of elementary in-service institutes had travel allowances for 4,225 participants and included fifty-five institutes at a cost of $505,430. Actually 4,172 attended programs during the year. This was the first year that attendance was less than the allotted travel allowances. Six of the supported programs involved television and the estimates of attendance were a little higher than the actual interest shown. A total of 132 proposals was submitted with asking budgets of $1,378,969 and travel allowances of approximately 7,400.

Three of the instituteswere in biological science, three in earth science, ten in general science, thirty one in mathematics, three in mathematics-science, and five in physical science.

The AAAS science materials for elementary schools were studied in detail at two of the institutes -- Florida State University and the University of Puerto Rico, College of Humacao.

Television programs were carried out by Florida State University, the University of Georgia, the University of Hawaii, Northern Michigan University, Minot State College, and Pacific Lutheran University. All of these were in the mathematics area, with the exception of the University of Hawaii in earth science and Northern Michigan University in the History of Science.

Four of the supported institutes had multiple sections at different centers. These were Purdue University, the University of Montana, the University of New Mexico, and East Carolina College. Several of the institutes advertised that they were working specifically with the School Mathematics Study Group materials.

SUMMARY STATEMENT

From the official beginning of elementary institutes in 1959 through the end of the 1966-1967 school year, the NSF has supported 531 institutes with an actual attendance of 22,045 elementary school personnel. The emphasis over the years was directed progressively toward providing training for those elementary teachers and programs thought to have large multiplier effects. Although the elementary institutes program is no longer in existence, it is probable that a number of supplemental type programs for the improvement of elementary school personnel will be supported in the future. During the year 1967-1968 ten conferences were scheduled where work was done with secondary teachers who were being prepared to work with in-service programs for elementary teachers.

The elementary institute program has reached less than two percent of the elementary teachers in the last eight years. However, evidence is available to show that many more teachers were influenced than actually attended a summer or

an in-service institute. The elementary institute programs have involved over two thousand people as directors, instructors, visiting speakers, and panelists from collegiate institutions. These people have become more aware of the problems facing elementary teachers in science and mathematics.

The value of institute programs to the teaching profession has received national recognition. For example, the University of Georgia in-service institute during the 1966-1967 school year was honored by the American Association of Colleges for Teacher Education with the awarding of the Distinguished Achievement Award.

In spite of the discontinuance of these programs by the National Science Foundation, there are other programs that are available to elementary school teachers. These include the Cooperative College-School Science projects of the National Science Foundation, and the Supplemental Projects program of the NSF in the Teacher Education Section. Local school systems have opportunities under Title III of the Elementary and Secondary Education Act with the United States Office of Education. States have funding available under the National Defense Education Act, Title III for programs involving elementary school teachers. In addition, the United States Office of Education supported eight projects for elementary school teachers in the science and mathematics area during the 1967-1968 academic year. The program supported 160 teachers at a cost of approximately $1,500,000. Thus, in this cutback the NSF did not leave the elementary teacher completely without sources of program support.

Over the years of support of this type of program the NSF attempted to: (1) give institutions of higher learning an opportunity to develop significant new materials for training elementary teachers; (2) provide suitable training for selected teachers and other leadership personnel; and (3) develop innovative prototypes for teacher-training efforts.

TABLE I

SUMMER INSTITUTES FOR ELEMENTARY SCHOOL PERSONNEL

PROGRAM HISTORY

Year	Proposals Received	Budget Requested	Stipends Requested	Institutes Granted	Budget Granted	Stipends Granted	Actual Attend
1959	54	$ 2,301,832	2,382	12	$ 470,300	515	547
1960	85	3,743,940	3,607	16	522,100	545[1]	570
1961	121	4,754,246	4,995	19	656,500	650	712
1962	86	2,840,791	2,870	21	710,100	712	788
1963	95	3,181,487	3,249	34	1,058,800	1,046[2]	1,232
1964	149	5,200,042	5,067	37	1,270,789	1,236[3]	1,274
1965	151	5,500,210	5,496	39	1,271,860	1,459	1,562
1966	122	4,528,284	4,822	26	864,440	988[4]	827
TOTALS	863	32,050,832	32,488	204	6,824,889	7,151	7,512

1 Includes data on Elementary-Secondary combined (3 elementary participants)
2 Includes data on Elementary-Secondary combined (10 elementary participants)
3 Includes data on Elementary-Secondary combined
4 Two summer Secondary Institutes provide support for 32 elementary participants (included in data) The 25 stipends (and 25,560 from limitation funds) for secondary school teachers in Columbia University's Project not included.

TABLE II

IN-SERVICE INSTITUTES FOR ELEMENTARY SCHOOL PERSONNEL

PROGRAM HISTORY

Year	Proposals Received	Budget Requested	Stipends Requested	Institutes Granted	Budget Granted	Stipends Granted	Actual Attending
1959-60	36	$ 283,375	1,190	11	$ 80,600	340	346
1960-61	43	380,700	1,350	13	73,990	405	434
1961-62	75	724,680	2,384	35	200,930	1,029	1,100
1962-63	80	587,167	2,937	35	202,665	1,060	1,295
1963-64	104	1,021,157	4,895	46	299,760	1,403	1,551
1964-65	139	1,184,904	6,045	70	464,630	2,118	2,385
1965-66	152	1,386,602	7,419	62	466,040	3,082	3,250
1966-67	132	1,378,969	7,400[1]	55	505,430	4,225	4,172
TOTALS	761	6,947,554	33,620	327	2,294,045	13,647	14,533

[1] Estimated

TABLE III

TOTAL NUMBER OF TEACHERS BY STATE OF RESIDENCE ATTENDING SUMMER INSTITUTES

Elementary School Personnel

State	Total Participants	% of U.S. Teachers	% of Teachers in State	State	Total Participants	% of U.S. Teachers	% of Teachers in State	State	Total Participants	% of U.S. Teachers	% of Teachers in State
Alabama	156	.013	0.90	Massachusetts	147	.013	0.46	South Dakota	39	.003	0.62
Alaska	8	.0007	0.48	Michigan	340	.029	0.69	Tennessee	83	.007	0.39
Arizona	76	.006	.61	Minnesota	234	.020	1.05	Texas	399	.034	0.61
Arkansas	63	.005	.67	Mississippi	147	.013	1.18	Utah	69	.006	1.10
California	408	.035	.37	Missouri	126	.011	0.42	Vermont	52	.004	1.84
Colorado	185	.016	.68	Montana	31	.003	0.54	Virginia	90	.008	0.36
Connecticut	89	.008	.49	Nebraska	53	.005	0.49	Washington	180	.015	0.99
Delaware	23	.002	.77	Nevada	28	.002	1.04	West Virginia	48	.004	0.50
Florida	243	.021	.83	New Hampshire	45	.004	1.06	Wisconsin	204	.017	0.72
Georgia	114	.010	.45	New Jersey	172	.015	0.39	Wyoming	45	.004	1.79
Hawaii	136	.012	3.3	New Mexico	118	.010	1.71				
Idaho	273	.023	6.7	New York	532	.045	0.53				
Illinois	277	.024	.40	North Carolina	131	.011	0.40	Washington D.C.	26	.002	0.66
Indiana	193	.016	.66	North Dakota	34	.003	0.67	Puerto Rico	49	.004	0.39
Iowa	144	.012	.73	Ohio	303	.026	0.50				
Kansas	151	.013	.89	Oklahoma	150	.013	1.07	Foreign (U.S.)	168		
Kentucky	38	.003	.20	Oregon	160	.014	1.18	Foreign	49		
Louisiana	134	.011	.58	Pennsylvania	232	.020	0.04				
Maine	39	.003	.57	Rhode Island	41	.004	0.81				
Maryland	117	.010	.57	South Carolina	120	.010	0.82				

TABLE IV

TOTAL NUMBER OF TEACHERS BY STATE OF RESIDENCE ATTENDING IN-SERVICE INSTITUTES

Elementary School Personnel

State	Total Participants	% of U.S. Teachers	% of Teachers in State	State	Total Participants	% of U.S. Teachers	% of Teachers in State	State	Total Participants	% of U.S. Teachers	% of Teachers in State
Alabama	287	.024	1.66	Massachusetts	143	.012	0.45	South Dakota	76	.007	1.20
Alaska				Michigan	652	.056	1.32	Tennessee	318	.027	1.48
Arizona	237	.020	1.89	Minnesota	153	.013	0.68	Texas	388	.033	0.60
Arkansas	263	.023	2.78	Mississippi	82	.007	0.66	Utah	93	.008	1.49
California	905	.077	0.83	Missouri	255	.022	0.85	Vermont	12	.001	0.42
Colorado	188	.016	1.44	Montana	505	.043	8.72	Virginia	410	.035	1.63
Connecticut	80	.007	0.44	Nebraska	146	.012	1.36	Washington	314	.027	1.73
Delaware	83	.007	2.79	Nevada	84	.007	3.12	West Virginia	0		
Florida	578	.049	1.98	New Hampshire	2	.0002	0.05	Wisconsin	78	.007	0.27
Georgia	1658	.141	6.47	New Jersey	373	.032	0.85	Wyoming	82	.007	3.26
Hawaii	372	.032	9.05	New Mexico	323	.028	4.67				
Idaho	374	.032	9.14	New York	822	.070	0.82	Washington, D.C.	0		
Illinois	254	.022	0.36	North Carolina	398	.034	1.20	Puerto Rico	256	.022	2.06
Indiana	374	.032	1.28	North Dakota	288	.025	5.64	Foreign	2		
Iowa	261	.022	1.32	Ohio	228	.019	0.38	Territories	28	.002	7.57
Kansas	431	.037	2.53	Oklahoma	473	.040	3.38				
Kentucky	32	.003	0.16	Oregon	233	.020	1.72				
Louisiana	343	.029	1.49	Pennsylvania	413	.035	0.69				
Maine	45	.004	0.66	Rhode Island	97	.008	1.92				
Maryland	10	.001	0.05	South Carolina	31	.003	0.21				

TABLE V

Total Proposals Submitted and Granted

by Areas

Elementary Summer Institutes 1959-1966

Area	Submitted	Granted
Biology	37	10
Earth Science	56	24
General Science	227	35
Mathematics	308	75
Mathemstical Science	133	36
Physical Science	100	24
Social Science	2	0
TOTALS	863	204

TABLE VI

Total Proposals Submitted and Granted

by Areas

Elementary In-Service 1959-1967

Area	Submitted	Granted
Biology	27	13
Earth Science	32	16
General Science	131	44
Mathematics	396	177
Mathematical Science	80	26
Physical Science	93	50
Social Science	2	0
TOTALS	761	326